

**University Of California, Berkeley**  
**Department of Mechanical Engineering**

**ME 163: Engineering Aerodynamics (3 units)**

**Elective Course**

*Syllabus*

**CATALOG DESCRIPTION**

Introduction to the lift, drag, and moment of two-dimensional airfoils, three-dimensional wings, and the complete airplane. Calculations of the performance and stability of airplanes in subsonic flight.

**COURSE PREREQUISITES**

ME 106.

**TEXTBOOK(S) AND/OR OTHER REQUIRED MATERIAL**

Proficiency in fundamental fluid dynamics, and in mathematics inasmuch as it is needed for that proficiency. Familiarity with the equations of motion for continuum, vector calculus, and differential equations. Computationally, proficiency in a high level programming environment of your choice (e.g. C/C++, Fortran, Mathematica, Matlab, IDL) to design algorithms and perform aerodynamics calculations.

**COURSE OBJECTIVES**

To develop a fundamental understanding of the science and art of aerodynamics, through rigorous theoretical discussions, analytical examples, and computational projects.

**DESIRED COURSE OUTCOMES**

Be able to estimate aerodynamics characteristics of canonical shapes, and acquire the tools requisite to take part in any complex aerodynamics endeavor.

**TOPICS COVERED**

Flow kinematics, the atmosphere, potential flow, the lift, drag, and moment of two-dimensional airfoils, three-dimensional wings, vortex wake, and high speed aerodynamics. Also, some analysis of the performance and stability of airplane in subsonic flight.

**CLASS/LABORATORY SCHEDULE**

Three hours of lecture per week.

## **CONTRIBUTION OF THE COURSE TO MEETING THE PROFESSIONAL COMPONENT**

Educate a well rounded engineer.

## **RELATIONSHIP OF THE COURSE TO ABET PROGRAM OUTCOMES**

An ability to apply knowledge of mathematics, science, and engineering. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. An ability to identify, formulate, and solve engineering problems. An ability to communicate effectively. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

## **ASSESSMENT OF STUDENT PROGRESS TOWARD COURSE OBJECTIVES**

Extensive homework, projects (typically three) and a midterm and a final exam.

**PERSON(S) WHO PREPARED THIS DESCRIPTION:** [Ömer Savas](#) Feb. 26, 2006